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ABSTRACT

This survey gathered information concerning computer assisted instruction (CAI) programs already in operation. A short questionnaire was sent to forty persons in various school districts in Illinois. Questions focused on enrollment, type of computers used, personnel support for computer operation, common CAI uses, and CAI costs. The questionnaire and the data gathered are presented. (DAG)

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Number 4

The Illinois Series on Educational Applications of Computers

THE USE OF COMPUTERS FOR INSTRUCTIONAL PURPOSES--A PRELIMINARY SURVEY OF SELECTED SECONDARY SCHOOLS IN ILLINOIS*

John Berryman[a], Richard Doring[b] and Daniel O'Rourke[c]

March 1976

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*Adapted from a paper prepared in a UIUC course, Computers for the Whole School (Secondary Education 459G)

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Introduction

One of the major problems in either the establishment of a new program of computer assisted instruction (henceforth called CAI) or the improvement of an already existing program is gaining access to information regarding programs in operation at other schools throughout the state. Most of the current programs were the first to be established in each school and, therefore, did not have a great deal of comparative data to serve as guidance. Hopefully, this problem can be alleviated as CAI is more widely used in the schools.

In an effort to create communication between CAI and administrative users throughout the state and to provide a curriculum forum for CAI, Dr. Bruce Hicks of the University of Illinois started the Illinois Series of Educational Applications of Computers (ISEAC) and established contact with approximately forty persons throughout Illinois who were known to be actively involved in the use of CAI or to be interested in establishing CAI in their respective schools.

In an endeavor to gather information concerning CAI programs already in operation, the authors developed the survey instrument (Appendix A) and sent it to those persons with whom Dr. Hicks was already corresponding. The committee received twenty-one replies (Appendix B), and the content of this report reflects the data obtained in those replies. The report items are summaries of what appeared to the authors to be the most pertinent information. When it is possible to report a more complete survey, each school's reply should be reviewed for other information which may be specific to a given reader's interest.

A much larger survey has been made for the second time in five years by the American Institutes for Research.* These surveys were national in scope and give useful background data to compare with the preliminary survey in Illinois reported here.

Description of Schools Involved in the Survey

Twenty-one schools responded to the survey. (See Appendix B.) These high schools ranged in enrollment from 350 to 3200 students. However, the smallest school indicating involvement in CAI had an enrollment of 1200. Thirteen other schools, all over 1200 and most over 2,000 in enrollment, reported extensive commitments to CAI. Exposure to CAI, it would appear is limited to students of large high schools mostly located in suburban or urban communities.

Equipment**

There appears to be primarily three types of computer systems in use at those schools which responded to the questionnaire: two computers, the Hewlett-Packard 2000F (4 schools), the Digital Equipment Company PDP8E (4 schools), and one maxicalculator, the Hewlett Packard 9830 (3 schools). In nearly every instance these machines were used in conjunction with peripheral equipment including a card reader, a printer, and terminals. These types of machines use BASIC, almost exclusively, as a programming language.

Where larger machines were reported (IBM 370, IBM 360, Four Phase IV/70 etc.), large scale administrative functions as well as CAI were performed with the machines.

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*Bukowski, William J. and Korotkin, Arthur L., "Computing Activities in Secondary Education," Educational Technology, Vol. 16, No. 1 (January 1976), pp. 9-22.

**The Department of Secondary Education at present uses two computer systems for educational applications: PLATO (with the TUTOR language) and the DEC 10 (with BASIC and other languages).

Personnel

As one might anticipate, the larger the school or school system, the more personnel assigned to the equipment and program. In all instances at least part-time assignments were given to staff members and in several cases the assignments were full time. The number of staff members assigned ranged from 1-50 but most schools reported 1 or 2 part-time assignments. Clerical and equipment operator assistance generally accompanied the use of the large machines. The use of student assistance was widely reported and several schools indicated plans to involve students in the future. The most common set-up was staff supervision accompanied by student operation.

CAI Uses

The most common use of CAI was reported in the area of mathematics instruction for classes unrelated to programming or to classes in data processing. However, uses of computers in science, programming, and data processing classes were common in most of the respondent schools. Other frequently reported uses were in the business, social studies, foreign language and language arts.

Most schools indicated that teachers wrote most of the programs used for CAI purposes and that a large percentage of the programs were purchased commercially. Student written programs were also reported by most schools, but the great majority of the programs were either teacher written or purchased. The general ratio of (teacher written)--(purchased)--(student written) appeared to be approximately 60-20-20 although several schools reported more nearly a 45-50-5 situation.

It would definitely appear that CAI has found its way beyond the mathematics area and is moving into many other areas of subject matter instruction.

Costs for CAI

Reported equipment costs ranged from $1,000 (for a used DEC PDP8E) to $70,000 per annum (for lease of each of several HP 2000 F's). However, the most commonly reported expenditure, to either purchase outright or lease to buy, was in the $15-$20,000 range. This would include one of the three previously mentioned maxicalculators (or a mini-computer), a card reader, and a printer. Equipment purchase is not an annual expense--these machines are reasonably durable and should last 10-15 years. Yearly maintenance costs were reported to be $1500-$2,000 or approximately 10 percent of the combined sales price for the computer, the reader, and the printer.

Personnel cost, the greatest annual expense, was reported as ranging from $0-$20,000 with the most commonly mentioned figure being $15,000. This figure represented either full or part-time staff assignments to the equipment and program.

Software (supplies, purchased programs, etc.) costs ranged from $0-$19,000 but a consensus figure in the software area is more difficult to determine. A rough estimate, based again on the computer-reader-printer set-up, would be from $1,000-$2,000 yearly.

Summary Costs

Although no school under 1200 enrollment reported a program for CAI, it may still be feasible for one of these smaller schools to embark on a CAI program based on a maxicalculator. It may also be appropriate to suggest that a time-sharing system financed by two or more districts be considered by the smaller schools.

For schools of 1200-2500 enrollment a sample analysis of first year maximum cost might appear as follows:

1.	Equipment (DEC PDP 8E, HP 2000, on HP 9830--plus a mark sense card reader and a printer)	$20,000.00*

*This figure may be spread out over several payments

*2.	Personnel (one full-time or 2 or more part-time staff members)	$15,000.00
3.	Maintenance	$ 2,000.00
4.	Software	$ 2,500.00
		$38,500.00

Listed below are some personnel assignment patterns frequently employed:

1. Student operated with equipment located near supervisor's room. Supervisor is paid an extra stipend for advising and supervising the students.
2. Student operated with a paid teacher aide as a supervisor and the program director paid an extra stipend.
3. Teacher released 2-3 periods to supervise and advise users.

A sample minimum annual cost might appear as follows:

1.	Equipment (same as above)	$4,000.00	(one of 5 payments)**
2.	Personnel (one teacher paid an extra stipend)	$1,200.00	
3.	Maintenance	$2,000.00	
4.	Software	$1,500.00	
		$8,700.00	
		$4,700.00	(after equipment purchase)

*May be reduced by using a variety of organizational patterns.

**Would be eliminated after final payment.

Appendix A

Instructional Applications of Computers
1975
Selected Illinois School Districts

1. School Name _____
2. School Address _____
(Street) (City) (State) (Zip)

3. Total Enrollment _____ 4. Grades _____ to _____.
5. Respondent _____
(Name) (Position)

I. Equipment	(Circle)	(fill in) Manufacturer	(fill in) Model	(fill in) Language
A. Maxicalculator*	Yes No			
B. Computer	Yes No			
C. Time Share Terminal	Yes No			
D. Other peripheral equipment (list)				
1.				
2.				
3.				
4.				

*Costs less than $20,000, may be programmed with a language comparable to BASIC. Examples: Wang 2200, Hewlett-Packard 9830.

II. Method of Equipment Finance	(Circle)	(Circle) Alone	(Circle) With other schools
A. Direct purchase	Yes No	X	X
B. Lease to buy	Yes No	X	X
C. Rent	Yes No	X	X

Comments _____

_____

III. Personnel (assigned to computer system)	No. full-time	No. part-time
A. Teachers		
B. Equipment operators		
C. General clerical		

D. Students (if students are used in a supervisory or instructional capacity, please explain below.)

Student use: _____

_____

_____

Other Comments: _____

_____

IV. Instructional Uses of Computer Equipment	Circle	Usage (% of total time)
A. Business	Yes No	
B. Home Economics	Yes No	
C. Science	Yes No	
D. Data Processing Classes	Yes No	
E. Programming Classes	Yes No	
F. Mathematics (non data processing)	Yes No	
G. Music	Yes No	
H. Industrial Arts	Yes No	
I. Arts/Crafts	Yes No	
J. Social Studies	Yes No	
K. Foreign Language	Yes No	
L. Language Arts	Yes No	
M. Physical Education	Yes No	
N. Driver Education	Yes No	
O. Administration (noninstructional)		
1. Student Scheduling	Yes No	
2. Payroll	Yes No	
3. General ledger (accounting) in District Office	Yes No	
P. Other _____		

Comments _____

_____

V. Source of Instructional Programs	Circle	% of total used
A. Purchased commercially	Yes No	
B. Teacher written	Yes No	
C. Student written	Yes No	
D. Other _____	Yes No	

VI. Costs (approximate) $_____

A. Equipment	
B. Personnel	
C. Maintenance	
D. Supplies	
E. Instructional Programs	
F. Other _____	
Total	$_____

VII. Please send the respondent a copy of the results of this questionnaire (Circle)
Yes No

Place the completed questionnaire in the return envelope and mail no later than November 15, 1975

Thank you.

SE-904
BH:dc

Appendix B

Respondents to the Questionnaire

John Apter
Moraine Valley Community College
10900 S. 88 Avenue
Palos Hills, IL 60465

Suellen Brauer
Eisenhower H.S.
1200 S. 16th Street
Decatur, IL 62521

Dr. Marvin Christianson
Township H.S. District 214
799 W. Kensington Rd.
Mt. Prospect, IL 60056

Mrs. Jahala De Moulin
Decatur Public School
101 W. Cerro Gordo St.
Decatur, IL 62523

Dr. Allan Dornseif
Matteson School Dist. 162
Matteson, IL 60443

Harlan Goldberg
Highland Park High School
433 Vine Avenue
Highland Park, IL 60035

Mr. Joe Green, Head
Business Education
Effingham High School
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SE-916

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Henry Taitt
Eastern Illinois University
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Mr. Benny Tucker
Mathematics Coordinator
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Hinsdale, IL 60521

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1959 North Waukegan Road
Deerfield, IL 60015